**Farming system analysis within AfricaRISING: Context & agenda**

**I. Introduction**

AfricaRISING (Africa Research in Sustainable Intensification for the Next Generation – *www.africa-rising.net*) is a **research component** of the Feed-the-Future program of USAID, operating in **maize-livestock systems** in Tanzania, Malawi, Zambia, Ghana (all led by IITA), and Ethiopia (led by ILRI). Conceptually, AfricaRISING is linked to the Humidtropics CGIAR Research Program (CRP) ([*www.humidtropics.org*](http://www.humidtropics.org)), which aims at sustainable intensification of farming systems in specific Action Areas in Africa, Latin-America, and Asia.

AfricaRISING operates **around 5 objectives**, **3 research-oriented**: (1) Integrated innovations increase production and / or improve productivity in a sustainable manner for targeted households at the Africa RISING research sites; (2) The aggregated impact of these farming practices at the household level contributes to an improved understanding of ecosystem stability at the landscape level; and (3) Wider dissemination of integrated innovations for SI leads to similar impacts beyond the Africa RISING action research sites; and 2 **development-oriented**: (4) Wider adoption of innovations identified and tested by the programme’s outputs within the Africa RISING action research sites enhances livelihoods through increased agricultural output, income diversity, reduced vulnerability to adverse environmental and economic challenges and improved nutrition and welfare, especially of young children and mothers; and (5) The development community initiates programmes, based on the knowledge tools and innovations developed and promoted by Africa RISING, that are directed at developmental goals that are consistent with the Africa RISING programme purpose.

**II. Research outputs and guiding principles**

AfricaRISING is organized around **4 research outputs** that are logically linked in time and place:

Research output 1: Situation Analysis and Programme-wide Synthesis

Research output 2: Integrated Systems Improvement.

Research output 3: Scaling and Delivery of Integrated Innovation.

Research output 4: Integrated M and E Process

**Guiding principles** of AfricaRISING include, amongst others:

1. The farm and household as focal domains: AfricaRISING will operate at the household and farming system level, at the problem identification, entry point identification, and monitoring and evaluation stages.

2. Sustainable intensification: AfricaRISING aims at enhancing productivity in a sustainable way by maximizing input use efficiencies, minimizing negative environmental externalities, and ensuring resilient systems.

3. Stepwise progress towards sustainable intensification: AfricaRISING recognizes that solutions towards sustainable intensification often required several steps that should each time result in visible improvements over current farming practices.

4. Farm household typologies and intensification pathways: Great diversity in resource endowments exist between farming typologies, with obvious consequence on the choice of solutions and the timing towards reaching sustainable intensification.

5. Identification and nature of critical entry points towards intensification: Entry points toward sustainable intensification will vary as a result of different environmental conditions (farming systems, markets access, etc) and farmer typologies (land access, soil fertility gradients, etc).

**III. Farming system analysis within AfricaRISING**

From the above it is clear that farming system analysis is an important component of AfricaRISING, both at the diagnostic, the entry point identification and evaluation, and the sustainability levels. **This document** describes how farming system analysis can contribute to AfricaRISING delivering on its objectives.

The **specific objectives** of farming system analysis include:

1. To characterize farming systems and identify opportunities for enhancing farm productivity and resource use efficiencies

2. To develop scenarios for sustainable intensification within the context of resources available to farming typologies, including targeting within-farm soil fertility gradients

3. To evaluate trade-offs between short term and longer term objectives and between production and environmental consequences of specific technologies

4. To evaluate the anticipated medium to long term impacts of specific investments at the farming system level

**IV. Approaches**

1. Farming system analysis and development of farming system case studies; includes:

- Farming system characterization (e.g., using the AfricaNUANCES tools), including assessment of variation in soil fertility status

- Farm typology definitions, focusing on resource endowment and production objectives

- Development of case studies for each of the typologies and for specific plots within a farm

*Note: This activity is done best at the timing of the baseline study and usually involves a more detailed characterization, including field and soil observations, for a sub-set of households participating in the baseline study.*

2. Development of input-output relationships; includes:

- Identification of input-output relationships for the main crops in the systems

- Identification of feed-livestock productivity relationships

- Identification of fertilizer/organic input – soil C/fertility relationships

- Identification of other input-output relationships as applicable to the farming systems

*Note: This information is in first instance obtained through secondary data but can be updated with observations taken during project implementation through appropriate M&E tools and procedures. Ground-truthing specific relationships maybe necessary through controlled field experiments, based on the importance of certain relationships for the target farming systems.*

3. Calibration of the farming system analysis tools; includes:

- Parameterization and validation of the FARMSIM (or other) modeling environment in relation to the various case study farms/fields

*Note: This activity builds on the results from the 2 previous activities and ensures that the system analysis tools are reflecting current conditions in the AfricaRISING target areas.*

4. Identification trade-offs around the key entry points; includes:

- Assessment of the optimal use of resources available to different farm typologies for investing in the identified entry points

- Assessment of the ex-ante farm level benefits related to the key entry points

- Assessment of the trade-offs between investing in the key entry points and the performance of other within-farm production units

- Assessment of the ex-ante short vs longer term benefits of investing in the key entry points

- Advising on the sequencing of interventions for different farm typologies to ensure that the different steps targeted will result in short-term benefits to farming households

- Integration of the results from this work into the discussions related to the identification of key entry points using participatory modeling approaches

*Note: This activity goes hand in hand with the identification of critical entry points and will inform the eventual trade-offs between investments in the entry points and the functioning of other within-farm production units. It will also identify trade-offs between short term benefits and longer-term sustainability issues. On a seasonal basis, feedback between the modeling work and the outcomes from the field activities will result in improved scenarios that should be integrated in the discussions around the identification of the subsequent set of key entry points.*

5. Ex-ante evaluation of medium to long-term impacts of specific interventions; includes:

- Identification of specific indicators addressing the longer term impact of specific interventions

- Validation of the medium to longer term performance of key technologies based on the current performance of the farms providing the highest outputs on investments made

- Ex-ante assessment of the status of above indicators as affected by the performance of the key entry points in the medium to long term

- Provision of feedback into the decision-making processes related to the identification and sequencing of entry points towards sustainable intensification

*Note: This activity will be implemented at a later stage in the project since sufficient field and farm-level data would need to be collected to ensure that the modeling work provides reasonable estimates.*

**V. Approximate costs**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Item** | **Year 1**  Oct 12 – Sept 13 | **Year 2**  Oct 13 – Sept 14 | **Year 3**  Oct 14 – Sept 15 | **Year 4**  Oct 15 – Sept 16 | **Total** |
| **ACROSS ALL COUNTRIES** |  |  |  |  |  |
| Farming system analyst | 0 | 0 | 0 | 0 | 0 |
| Computing equipment | 5,000 | 1,000 | 1,000 | 1,000 | 8,000 |
| Admin support (internet, communication, etc) | 6,000 | 2,000 | 2,000 | 2,000 | 12,000 |
| **Sub-total** | **11,000** | **3,000** | **3,000** | **3,000** | **20,000** |
| **GHANA, TZ, ETH** |  |  |  |  |  |
| Travel of the farming system analysis to the sites | 3,000 | 3,000 | 3,000 | 3,000 | 12,000 |
| Farming system characterization | 15,000 | 7,500 | 0 | 0 | 22,500 |
| Soil and plant analyses | 5,000 | 2,500 | 0 | 0 | 7,500 |
| PhD student | 12,000 | 12,000 | 12,000 | 12,000 | 48,000 |
| Sub-total per country | 35,000 | 25,000 | 15,000 | 15,000 | 90,000 |
| **Sub-total for 3 countries** | **105,000** | **75,000** | **45,000** | **45,000** | **270,000** |
| MALAWI, ZAMBIA |  |  |  |  |  |
| Travel of the farming system analysis to the sites | 3,000 | 3,000 | 3,000 | 3,000 | 12,000 |
| Farming system characterization | 15,000 | 7,500 | 0 | 0 | 22,500 |
| Soil and plant analyses | 5,000 | 2,500 | 0 | 0 | 7,500 |
| Sub-total per country | 23,000 | 13,000 | 3,000 | 3,000 | 42,000 |
| **Sub-total for 2 countries** | **46,000** | **26,000** | **6,000** | **6,000** | **84,000** |
| **OVERALL TOTAL** | **162,000** | **104,000** | **54,000** | **54,000** | **374,000** |